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Kansas
State Manual Training
Normal

Industrial Arts Bulletin

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DECEMBER, 1913.

Kansas
State Manual Training Normal School,

A COLLEGE FOR TEACHERS, ESPECIALLY OF TECHNICAL VOCATIONAL SUBJECTS.

PITTSBURG, KANSAS.

ISSUED QUARTERLY.

STATE PRINTING OFFICE,
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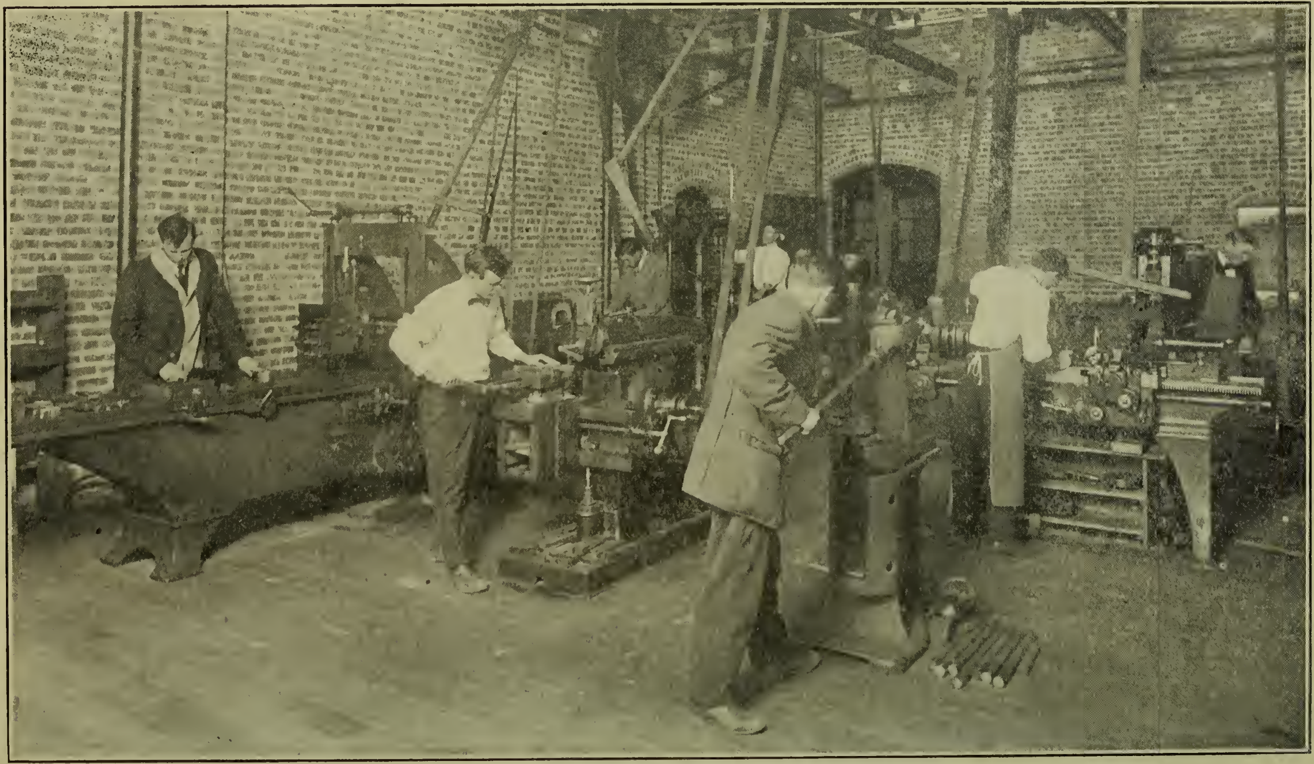


MACHINE SHOP.

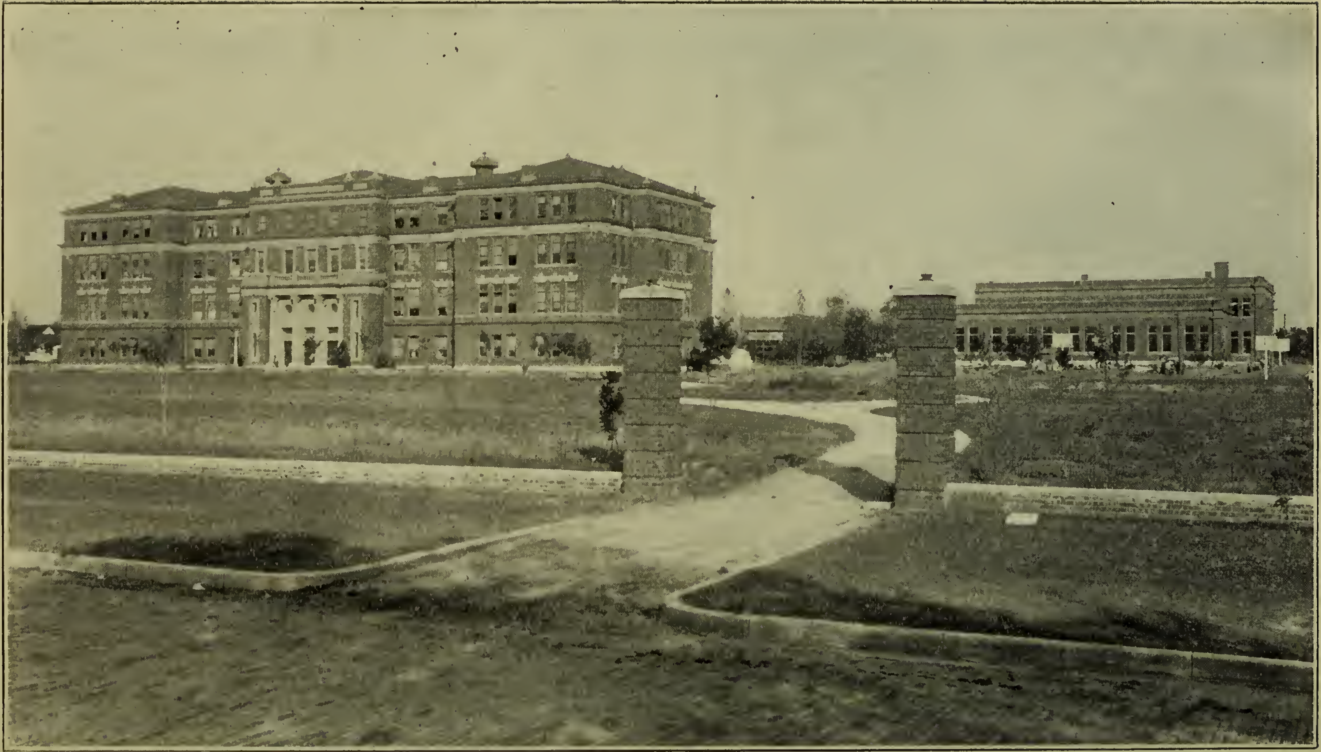
SCHOOL CALENDAR.

January 5, Monday	Work opens for 1914.
January 26, Monday	Midwinter term opens.
March 27, Friday	Commemoration Day.
March 30, Monday	Spring term opens.
May 26, Tuesday	Annual Recital by Dept. of Music.
May 29, Friday	Contest in Oration.
May 29, Friday	Contest in Debate.
May 31, Sunday	Baccalaureate Address.
June 2, Tuesday, A. M.	Commencement.
June 3, Wednesday	Enrollment for Summer School.
July 31, Friday	Summer School closes.
Sept. 8, Tuesday	Fall term opens.

ANNOUNCEMENT.

The second semester begins January 25, 1914. At this time all classes will be reorganized, new classes formed, and an opportunity afforded for taking up any work desired in the institution.

By entering at the beginning of the second semester, carrying heavy work, and remaining through the summer term of ten weeks, one can accomplish nearly a year's work.



Russ Hall. Industrial Arts Building.

STATE MANUAL TRAINING NORMAL, PITTSBURG, KAN.

FOREWORD.

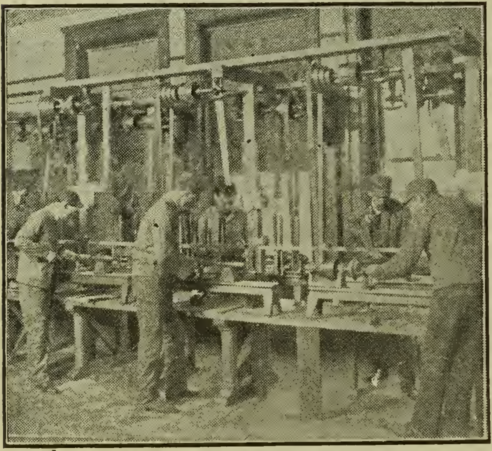
IN the year 1903 the state legislature passed an act establishing the State Manual Training Normal School. During the six years following the student body was housed in the Central Public School Building on the corner of Fifth and Walnut, a building loaned to the state by the city of Pittsburg. In January, 1909, the school was moved into the magnificent new building on South Broadway, between Cleveland and Lindburg avenues, its present location. From an enrollment of 50 at the opening of school in 1903 the student body of the State Manual Training Normal School has increased annually until it reached an enrollment last year of 1416, which was an increase over any former year's enrollment. To date for the year 1913-'14 the enrollment is 30 per cent greater than that of last year on the same date. The phenomenal increase in attendance from year to year has not been due to advertising, but rather to the excellent and high standard of work, and to the many practical courses offered along lines of modern technical and vocational education.

The new Industrial Arts Building was occupied at the opening of the present school year, and by January 1, 1914, will be fully and completely equipped, which will make the school one of the best equipped institutions for teaching and training in all lines of education looking toward the proper correlation and coördination of the industrial arts subjects in the entire country. We believe that the most effective and practical teaching of technique can be realized only through activity directed toward the performing of some useful and desirable accomplishment; that teachers must be enabled to function the teaching within the school in world activity without. To those looking for the most practical and proficient education, we invite you to study courses offered by the State Manual Training Normal School. Address all communications to

W. A. BRANDENBURG, *President.*

Woodwork.

This department is organized to give instruction in the various phases of wood work with courses adapted to the elementary and secondary schools. The work is presented from the teacher's point of view. Notes and suggestions are given and readings are required that will be of practical benefit to teachers in organizing manual-training courses, and in equipping for the work. Each student is given an opportunity for practical experience. He may take charge of classes, present the work, and perform all the duties of the regular teacher in charge.



WOOD TURNING.

The department now occupies six large sky-lighted rooms in the new Industrial Arts Building which was completed during the last summer. Each room is elaborately equipped with the best and latest improved tools, benches, and machines that money can buy. More than six thousand dollars has recently been expended for equipment, in addition to that already possessed by the department. There are but few technical schools in the country with equipment surpassing this, and we are quite sure there is not a school for the training of teachers that possesses an equipment so elaborate.

The following courses are now offered in this department:

Elementary Benchwork.
Cabinetmaking.
Wood Turning.
Pattern Making.
House Construction and Stair Building.
Wood Finishing.
Specialization.
Manual Methods.

It is planned to add other courses from time to time as the needs and conditions arise.

The demand for trained teachers of manual training is much greater than the supply, and the demand for those who can teach the subject is increasing from year to year. During the past school year the calls that have come to us for teachers for this work have far exceeded the supply. Many calls come to us for those who can teach manual training a part of the time and academic subjects the remainder of the time. Teachers of this class are paid better salaries than those who can teach the academic branches only.

It is the policy of the school to at all times extend aid in securing positions for those who are properly qualified for this line of work.

Machine Construction.

This department offers instruction in machine shop practice, pattern making, foundry practice, and forging. As the success of this department depends considerably upon blue prints and sketches, drawing and sketching being the language of the shop, the mechanical drawing department is so organized as to make for thorough coöperation. (See Department of Drawing and Design.)

For correlated courses of industrial physics, shop mathematics, industrial history, industrial geography, see those respective departments. There is a growing demand for teachers of vocational subjects who can teach the correct foundation of a trade. The teacher of industrial subjects should be above the grade of the ordinary mechanic. At the present time, the industrial subjects taught in the public schools of this country are divided into two main groups—the building trades group and the machine construction trades group.

The department of machine construction in the State Manual Training Normal offers to teachers and those preparing to teach an opportunity to specialize in any one or all of the metal working branches, including pattern making, this being a metal working trade wherever economic manufacturing is practiced. The professional courses are recommended to those who have administrative talents and who only need to have a general knowledge of the work. All students planning to teach these lines are required to take the professional courses. As the pedagogy of industrial shop work differs widely from that of academic studies, special attention is given to that side of all subjects in this department.

Courses of Study.

MACHINE SHOP.

I. *Professional machine shop practice.*

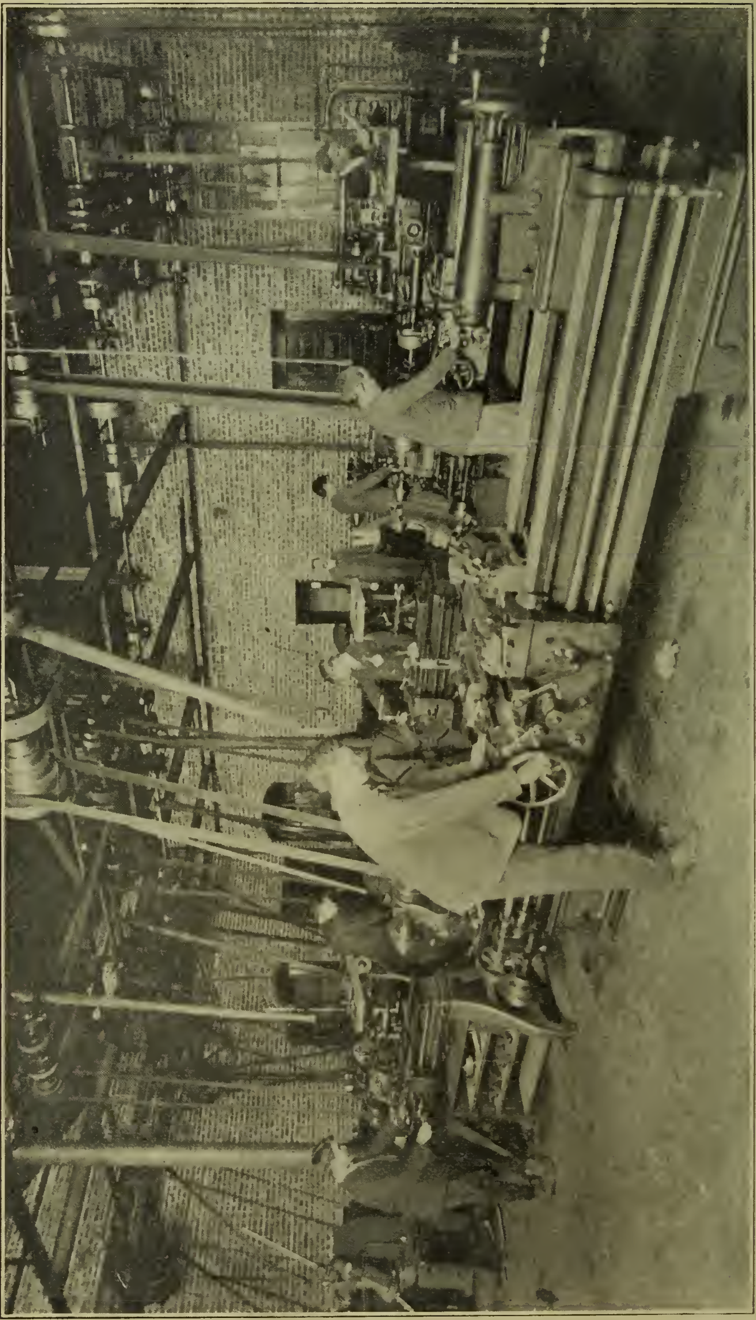
Lectures, demonstrations (10 weeks).
Shop practice (10 weeks).

Lectures:

Machine shop pedagogy, class management, preparation and presentation of material, planning of courses, equipment and its installation, building layouts, buying materials, related subjects, manufacturing of iron and steel and nonferrous metals, industrial economics, industrial methods of production, shop science, theory of cutting tools, shop literature, library work.

Shop work:

Vise work, speed lathe and engine lathe work, shaper and planer work, milling machine work, etc.



MACHINE SHOP—LATHE WORK.

II. *Bench work and speed lathe turning.*

A general foundation for all metal working trades, for elementary schools with small equipment.

Shop work and demonstrations:

Vise work, chipping, filing, fitting, scraping, soldering, sweating, babbitting, brazing, laying out, centering, drilling in lathe, turning iron, steel and brass with hand tools, thread cutting with taps, dies and chasers, key fitting, keyway cutting, riveting, knurling, polishing, burnishing, lettering, painting, lacquering, metal spinning, case hardening, hardening and tempering steel, assembling.

III. *Drill press work:* Laying out, centering, chipping centers, fastening work to table, drilling, counterboring, boring, taper boring, reaming, slotting, keyway cutting.

IV. *Engine lathe work:* Straight and taper turning, eccentric turning and boring, thread cutting, chuck work, boring-bar work, reaming, steady rest and follower rest work, lapping, gear cutting, screw slotting, sawing off stock.

V. *Planer and shaper work:* Methods of holding work in chuck, on platen, with pins, by magnetism. Planer parallels, dovetails, tee slots, keyways, racks, work on centers.

VI. *Milling machine work:* Slab milling, slitting, end milling, gear cutting, slotting, cutting spiral gears and racks, work on centers, work on table, work in vise or angle plate, keyways, tee slots, drilling, laying out jigs, etc.

VII. *Precision grinding:* Sharpening reamers, end mills, milling cutters, gear cutters, mandrels, arbors and tools of all descriptions, finishing turned work, internal grinding.

VIII. *Tool making:* Dies, taps, forming tools, drills, gauges, templets, jigs, fixtures, punches and dies for punch press work, turret lathe tools, tools for economic production.

IX. *Erecting and constructing:* Fitting, adjusting and assembling of new apparatus, repairing old machinery, "run of shop" jobs for the school, engines, motors, lathes, metal and woodworking vises.

X. *Instrument and model making:* Making and repairing of apparatus for the physics department and mechanics laboratories—for teachers of these lines who have a limited equipment.

XI. *General machine shop practice:* The care and use of all tools and machines in the machine shop, including the forging, hardening and tempering of tools for lathes, planers, etc. The high-school student who has found his bent can take this general course as a preparation for the machinist and toolmakers' profession. This course is flexible enough to meet the needs of the apprentice, and the professional machinist, who want to improve themselves; for the farmer and chauffeur who want to learn the care, repairing and adjusting of gasoline and steam engines; for the country blacksmith who is doing an increasing amount of automobile repairing; for the miner who wants to know something of the repairing of mine machinery. (See courses in forging and millwrighting.)

XII. *Millwrighting:* This course should be taken by every teacher of wood work and metal work who uses machinery, for the purpose of keeping his equipment in good running order. Hanging and lining of shafting, erecting machinery, concrete and other foundations, babbitting, scraping and adjusting bearings, figuring of pulley speeds and diameters, lacing and fastenings for belting, fitting keys, cutting keyways by hand, lubricants and lubrication, organization of plant.

FORGING.

I. *Professional forging.*

Demonstrations, lectures (10 weeks).
Practice at the forge (10 weeks).

Forge shop pedagogy, class management, preparation and presentation of materials, planning of courses, equipment and its installation, building layouts, buying materials, related subjects, manufacturing of iron and steel, fuels, fluxes, theory of welding, industrial methods of production, shop economics. Literature of forging, textbook work.

II. *Agricultural forging:* The making and repairing of wagons, farm tools, and machinery.

III. *Machine blacksmithing:* The making of forgings for machine shop, engines, forge shop, foundry, and building repairs.

IV. *Toolsmithing:* The making of tools for lathe, planer, shaper, and general machine shop use, hammers, screw drivers, chisels, and tools for bricklaying, plumbing, forging, etc. The manipulation of tool steel and high-speed steels, annealing, hardening and tempering.

V. *Mine repair work:* A short course in the general repairing of mine machinery and the hardening and tempering of miners' drills, picks, and tools.

VI. *Farmers and chauffeurs repair work:* A short course in the general repairing of implements, machinery and engines, and the tempering of tools.

VII. *Decorative forging, and copper work:* The making of irons, fire sets, brackets, candlesticks, lanterns, lamps, grilles, etc., for arts and crafts teachers.

FOUNDRY PRACTICE.

I. *Professional foundry practice.*

Demonstrations, lectures (10 weeks).

Elementary foundry practice (10 weeks).

Foundry pedagogy, management and organization, preparation and presentation of material, planning courses of study, equipment and its installation, building layouts, buying materials, related studies, mixing and melting of iron and nonferrous metals, molding machines, foundry economics, industrial methods of production, selecting of molding sands, core sands and binders, cupola and ladle linings.

Foundry literature.

II. *Bench molding:* Snap flask work on small castings for machine shop, duplicate work for plant and building repairs, setting cores, pouring with hand ladle.

III. *Floor molding:* Two- and three-part flask work, sweep molding, making large castings for "run of shop" jobs, use of crane, pouring with large ladle.

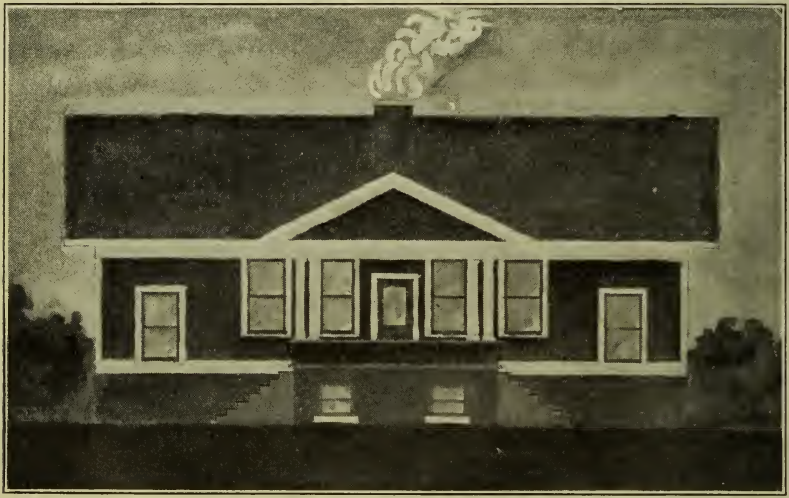
IV. *Core making:* Mixing core sand and binders, baking cores in core oven, blacking cores, setting cores.

V. *Cupola practice:* Lining, daubing, repairing, charging of cupola and ladles, melting and mixing of irons.

VI. *Brass furnace work:* Charging, firing and repairing of brass furnace, mixing and melting of brass, aluminum, bronzes, etc.

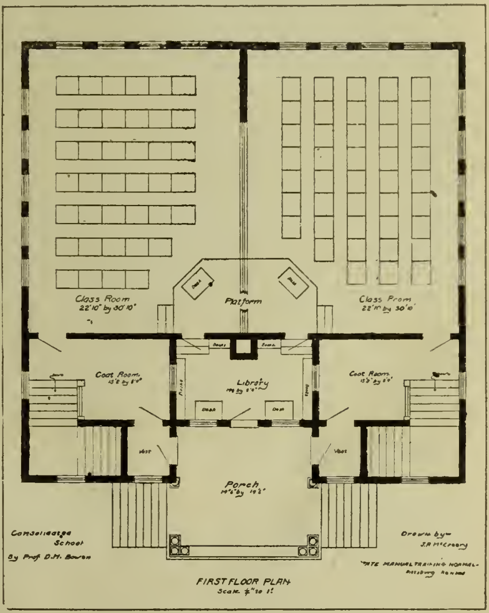
Drawing and Design.

There is a growing demand for special teachers of drawing in our public schools as the importance of the subject is being realized by progressive schoolmen. We are beginning to understand that the pupils must be brought to appreciate the finer qualities of the visible world in which they live, the works of nature and of man; and only by making an attempt to delineate these forms can they gain an understanding of them. Every student should have the training which comes through the conscious control of the hand in making a representation of the beautiful growths of nature, and the power of appreciation to be gained through a study of the works of the great master artists. Ninety-five per cent of our education is received through the eyes, and teachers are beginning to realize the importance of this fact, for through such study will come a development of taste. As the student comes to realize his growing powers, he will express himself in terms of art, for art is but creative self-expression, and when a worker succeeds in doing his task a little better than he has ever done it before and feels a joy in the doing, he has brought the true spirit of art into his life, be he a painter of pictures or a builder of bridges. To reach its highest expression, art must have freedom and leisure. Even with the common worker, or the pupil in the schoolroom, every original thought should be encouraged and prized, that it may be purified, transformed, and expanded into fuller meaning.



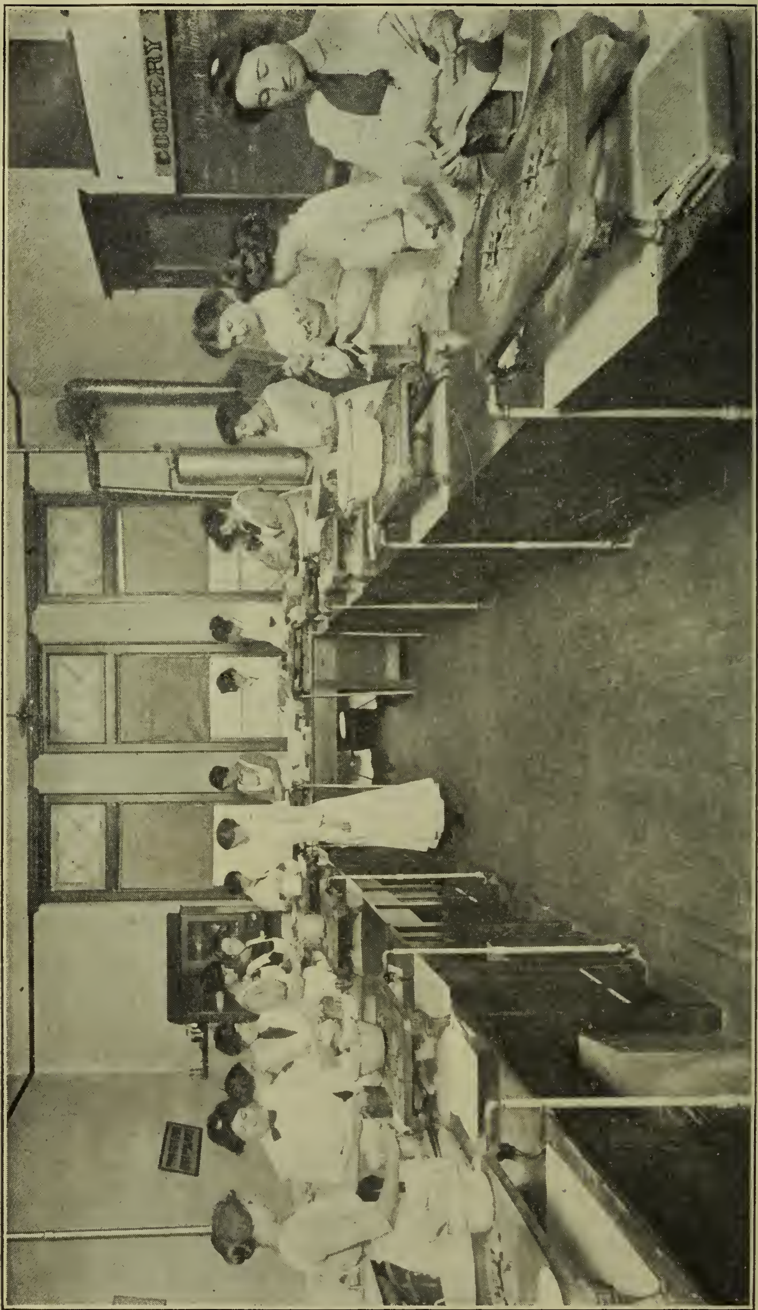
CONSOLIDATED COUNTRY SCHOOL.
Designed and drawn by students.

But genius or talent in drawing is found but rarely; and while work is provided for those who have special ability to prepare themselves to be teachers of drawing or to enable the grade teacher to secure adequate work from her pupils, the large majority of the students are from the industrial departments, whether they be workers in wood, iron, sewing, cookery, or agriculture. Here, where the work is in close relation to the vital problems of life, rather than to attempt to discover or develop artists, the aim is to bring the art spirit into the material world in which they work. The shop instructor will develop skill in his particular line, but beyond the technical skill of any craft there is a deeper, more subtle, spiritual power, in which may be found the desires, the ideals, the individuality of the worker. The older European countries have understood this, and with them drawing is taught, that it may assist in the perfecting of workmanship. Manufacturers in this country are realizing that drawing must be taught in the public schools, and are demanding that it be given in such form that it will serve their needs. This may be seen in the comments of writers in any standard technical publication. They know that their products must be made attractive as well as of sound construction, for the increasing taste of the people is demanding a higher quality of workmanship, with simple, well-designed lines, rather than the crude, over-decorated, cheap constructions. When this country was new, with vast undeveloped resources, apparently unlimited in extent, the easy accumulation of money overshadowed taste by display. But with the readjustment of the present time has come a reaction.



Consolidated country school, floor plan.

To meet the demand of the times, the workman must be well trained in drawing, both mechanical and free-hand, that he may be enabled to think and talk intelligently of his work. If he can illustrate his ideas by means of a clear, simple sketch, he will have a new shop language which will enable him to form a clear mental picture of a project under construction. He will be able to read his drawing or blue print quickly and with understanding; he can better plan his work as it progresses, thereby gaining in skill and efficiency. If he advances beyond the workman stage to that of a designer, which any one may attempt, he must have the power to express his ideas of form and structure with grace of line and harmony of color. He may be a designer of homes, of dress, or of implements, but if done with the joy of achievement, his work will reach its best and will be a real contribution to humanity.



DOMESTIC SCIENCE LABORATORY—ELEMENTARY KITCHEN.

Domestic Science.

Domestic science has been defined as the science of the home. If we realize that "the home is the germ of Anglo-Saxon civilization, the unit of social progress; that no community rises above the average of its individual homes in intelligence, courage, honesty, industry, thrift, patriotism, or any other individual or civic virtue; that the home is the nursery of the citizen; that nothing which church, school or state can do will quite make up for the lack in the home," then we must acknowledge that no subject is of greater importance than this.

CAKE MADE BY STUDENTS.

Work in domestic science is offered in the third and fourth years of high school and in the four years of the Normal College.

Normal High School.

Realizing that some students will discontinue their school work upon completion of the high-school course, an attempt is made to make the work of real practical value and of such a nature as to have a decided influence upon the future home life of the students.

COURSE I. Third year, first term.

Food and its preparation.

Study of fuels, and their composition; water—kinds, composition and uses—applied in making of tea, coffee, cocoa, fruit drinks, and so forth.

Classification of foods; source, composition, effect of heat, digestibility, and so forth.

Study of fruits and vegetables; cooking of sauces; sugar cookery; cereals.

DOMESTIC SCIENCE—BREAD MAKING. ADVANCED LABORATORY.

COURSE II. Third year, second term.

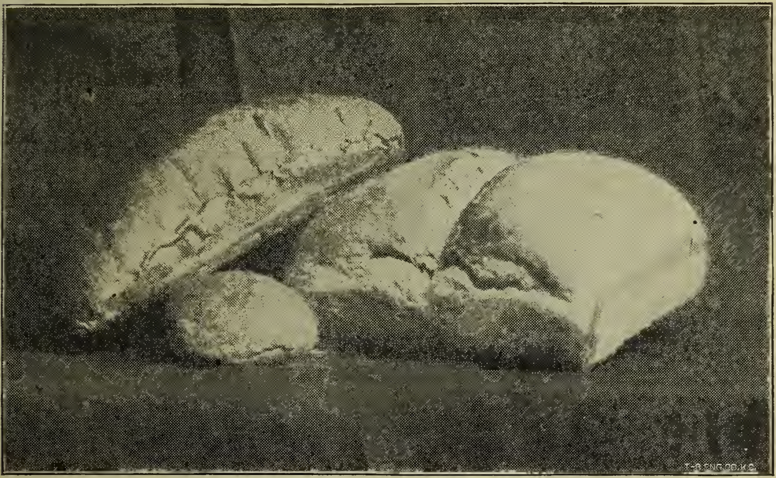
- Study of proteins. Illustrated by cooking eggs, milk, cheese, and meat.
- Study of doughs and batters.
- Lessons in bread making.

COURSE III. Fouth year, first term.

- Study of fats. Illustrated in salads and pastry.
- Making of cakes, desserts, and so forth.
- Table service. Planning and serving meals, both formal and informal.

COURSE IV. Fourth year, second term.

- Household sanitation.
- Personal sanitation.
- Elementary invalid cookery.
- Elementary work in dietetics.
- Elementary work in laundry.



BREAD MADE BY STUDENTS.

Normal College.

COURSE 11. Freshman year, first term.

Study of foods—growth, manufacture, and preparation; marketing, storing, and value as food.

Principles underlying cooking of carbohydrates and proteins.

COURSE 12. Freshman year, second term.

Study of foods.

Principles underlying cooking of fats.

Doughs and batters.

COURSE 13. Sophomore year, first term.

Food preservation.

Bread making.

Invalid cookery.

Table service. Serving of meals from esthetic and nutritive standpoint; economy of time, money and labor in preparation.

COURSE 14. Sophomore year, second term.

Laundry course.

Dietetics—fuel value of foods, dietary standards, computing dietaries.

School lunches.

Demonstrations.

Methods of teaching domestic science.

COURSE 15. Junior year, first term.

Household sanitation. Location, surroundings, construction, etc., as related to health problems. Heating, lighting, and ventilation; sanitary plumbing; disposal of waste and drainage. Water, ice, and milk supplies. Relation of microörganisms to the problems of the household. Household pests and methods of extermination.

Household management. Place of the home in consumption of wealth. Study of the present economic position of woman, and its effect upon the family. Use of money; house expenditures; time economy. Division of the income. Family budgets. Household accounts. Organization of housework and division of labor. Domestic service problem.

COURSE 16. Junior year, second term.

Methods of teaching domestic science. History of movement of home economics. Purpose and value of the work in schools. Content of the subject and its relation to other work in the curriculum. Courses of study for elementary and secondary schools.

Principles of teaching domestic science. Study of equipment, arrangement, cost, etc.

Demonstrations.

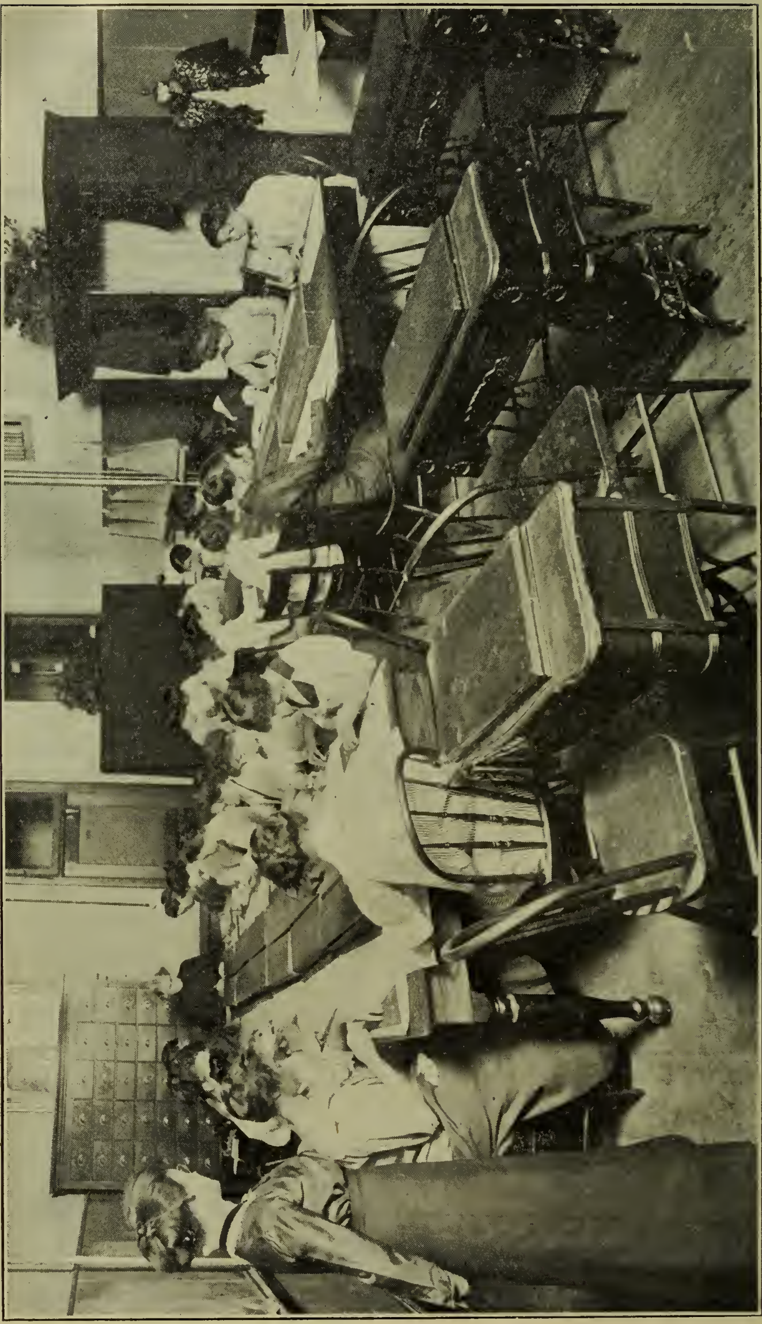
COURSE 17. Senior year.

Advanced work in dietetics.

Study of dietary standards. Preparation of exhibits, representing certain food values.

Planning and serving meals adapted to different conditions of age, sex, climate, occupation, cost, etc.

DINING ROOM, DOMESTIC SCIENCE DEPARTMENT.



DOMESTIC ART—DRAFTING PATTERNS.

Domestic Art.

The courses in machine sewing range from the making of simple underwear to the more complex and elaborate problems of dressmaking and tailoring. Instruction in drafting and designing accompanies these courses. In drafting, the purpose is to give girls skill and accuracy in the draft, facility to correct and adapt purchased patterns, and ideals of good lines and proportions. Using foundation patterns, designing is done in pleated, draped, and fancy waists, skirts, and sleeves, in paper and cloth patterns.

Baby cap made by student.

The course in millinery consists of the designing and making of buckram and wire frames, covering and trimming of winter and spring hats. The aim is three-fold: of developing skill and originality, artistic appreciation of color and hue, especially in its relation to individual, and economy in the utilization of old material by cleaning and renovation.

Art needlework and handwork includes the various types of embroidery, crocheting, netting, and tatting. Special attention is given to its application to uses in courses of study in high school and grades.

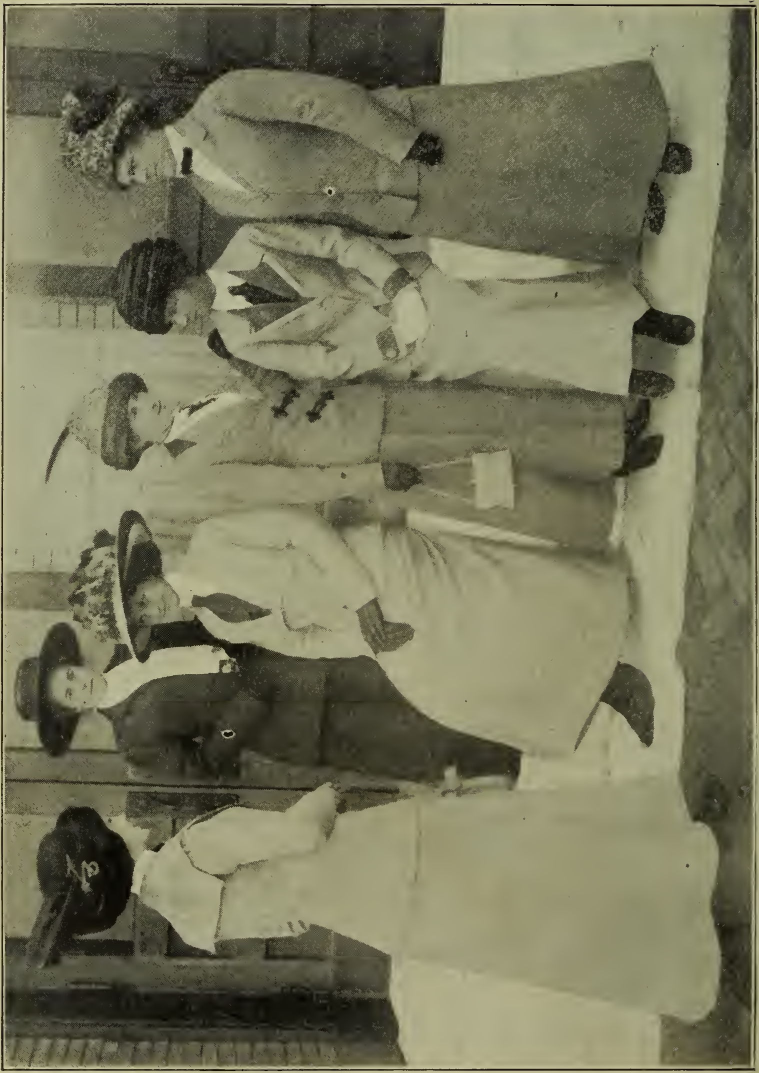
The pedagogical and professional phase of domestic art varies much from academic subjects. Study and comparison of courses of study in domestic art, presentation of subject matter, equipment, plans of rooms, sources of illustrative material, and correlation with other courses in curriculum are made. At present this is taught in connection with various other courses.

The department of domestic art offers courses embracing the following subjects:

1. Hand sewing.
2. Textiles.
3. Machine sewing, including making of underwear, dressmaking, and tailoring.
4. Drafting and designing of patterns.
5. Millinery.
6. Art needlework and hand work.
7. Pedagogical and professional phase.

These courses are given primarily for those taking degrees and life cer-

Doily made by student.



SUITS MADE IN DOMESTIC ART DEPARTMENT.

tificates. In addition to the above course is the home-makers' course, the object of which is not primarily to prepare young women for teaching but for efficiency in home life.

Handkerchief made by student.

All courses are supplemented by instruction given in art department, by geography in relation to sources and distribution of raw material and manufacture of same, by chemistry as applied to textiles.

In the course in hand sewing the various stitches and repairing processes are taught upon articles of use.

The purpose of the course in textiles is to give the student a basis for more economical and intelligent buying of materials. A study of spinning and weaving; a study of the common fibers of commerce; the uses of the simple microscopic and chemical tests for determining kinds of fibers in cloth; and the adulteration, dyeing and finishing of fabrics constitute the major part of the work.

Apron made by student.

History and Social Sciences.

The growth of this department has been as phenomenal as the growth of the institution. Six years ago it was very limited as to courses and enrollment. To-day it is offering eight high-school courses and sixteen college courses.

It has been the aim of this department to keep pace with the modern ideals in education, and to that end special emphasis is laid upon the social and industrial aspects of the subject.

Courses in sociology, both theoretical and applied, are offered; also, courses in rural and theoretical economics, and industrial history.

The evolutionary theory, and not the revolutionary theory, of history, politics, society and industry is stressed.

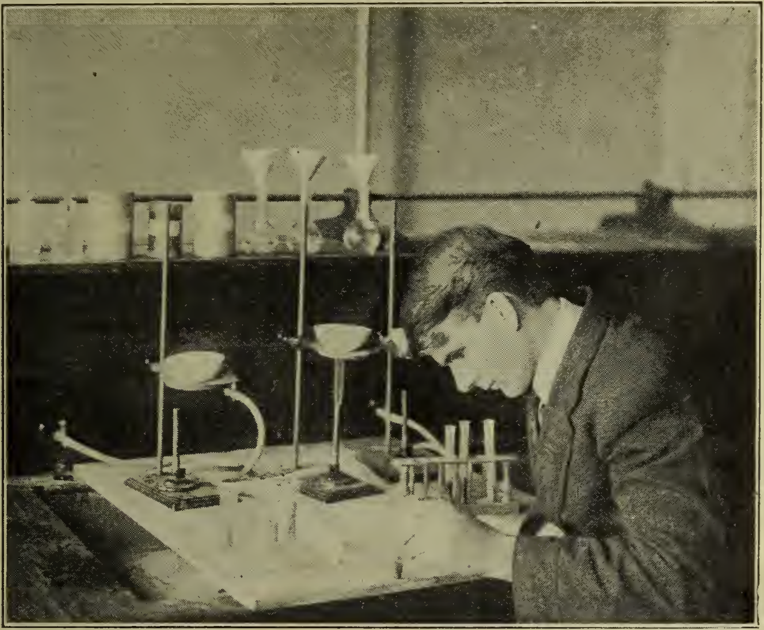
This department is in a position to offer a large number of courses by correspondence, and is doing a considerable amount of this kind of work. It is the desire of the department to render as large a service as is possible, and we invite our friends to use us. For descriptions of course and credits given for each we refer you to the catalogue. If you do not have a catalogue, write to the president, who is always ready and anxious to serve you.

It may be of interest to know that we do a good deal of laboratory work wherever it is possible. Students are sent out to make special surveys and endeavor to detect the practical application of the theories of economics and society. Maps are made giving place significance, as well as illustrating other phases of the work.

Illustrated lectures are given and free discussion invited. Debates and papers are prepared and presented. And in these days of tariff reform, industrial evolution, woman suffrage, and political unrest, topics are not wanting for live class work. Memorizing dry facts is not history. These facts must be organized and related. The study of history is the study of the mind of man. Thought is a living thing, and we do our work in this department with the end in view of the discovery and mastery of the thought and its relation to our day and time. We recognize the informational, instrumental and cultural value of the subject and try to make it serve these ends.

Chemistry.

The courses offered in chemistry are divided into groups designed to give the student that chemical knowledge which he will use in his life work. The students in the laboratory class and lecture work are made to see the real connection between the work of the classroom and that which people are doing for a livelihood. Two distinct types of courses are given—one for men, the other for women. This division is necessary chiefly because the chemical knowledge needed for doing the work of the home in the safest, best and most economical way is essentially different from that required of the man on the farm, in the factory, or in the other various industrial pursuits. In the high school, one year's work in chemistry is offered for the girls. This course consists of the study of such subjects as air, water, foods, and cleansing agents, together with the easier tests for the classes of foods and food adulterants. Emphasis is placed upon a clear understanding of the principles of the chemistry involved, and students readily grasp these, because they realize that this is necessary in order that they may do their work properly. One year's work in chemistry in the high school is offered for the boys. This course correlates with the problems the boy meets on the farm, as enriching the soil, stock feeding and care, dairying; also those of the shop and factory.



STUDENT MAKING ANALYSIS.

In the college, work is given in both quantitative and qualitative analyses of substances usually found in our industrial activities. The student again finds the necessity of learning the principles involved, because it is essential to the understanding of the work to be done. Organic, agricultural, and industrial chemistry are each studied in the same manner. The young man finds certain principles to be mastered in order to properly do the task assigned.

For the women, the work in college chemistry for domestic science students consists in the identification of food adulterants and preservatives, the effect of these upon the body, the analysis and relation of the different classes of foods. The chemical principles involved in the preparation, digestion, and assimilation of the food are also studied. The kitchen is essentially the chemical laboratory of the home. The young woman realizes that if the best products are to be produced in her kitchen in the easiest and most economical way she must thoroughly understand the science involved, and therefore studies with a purpose the difficult chemical reactions. In the college work, a course in textile chemistry is offered, which correlates with the work in sewing. The student studies the analysis of the different textiles, that she may quickly identify the materials found in cloth and detect the adulterations, which are numerous. In household chemistry, the application of the principles of chemistry in sanitation, cleaning, and the proper use of the chemicals usually found in the home are studied.

Physics.

The courses in physics are designed to correlate very closely with the industrial work of the institution. The high-school class is divided into two sections. The section for the boys is called industrial physics, and is planned to meet the needs of industrial students. The principles of machinery, strength of materials, efficiency of machines, road construction, and similar practical topics, form the main part of the course.

The other section, which is for the girls, is called household physics, and deals with the general principles of physics and their application to the various household appliances, such as house construction, heating and ventilation of dwellings, washing machines, vacuum cleaners, household plumbing and lighting, and construction of furniture.

The dominant idea in this course is to make the applications of physics to all those things with which a woman is in daily contact, rather than to the appliances which belong to the sphere of activity of man.

In both courses, however, the cultural value of the subject is maintained, and accordingly the modern theories of the nature of matter, electricity, etc., are given considerable attention. Also such subjects as the aëroplane, X-ray, wireless telegraphy, are included because of their cultural value.

The courses in the college department carry out this idea still further, and accordingly there are several courses in industrial and household physics offered. In many high schools, physics is being taught by the instructor of manual training, and consequently many students are preparing themselves to meet this demand.

A practical course in electric wiring and installations is offered as an elective in either the high school or college departments. In this course practical work is done in installing electric motors, wiring for light and power, and general repair work. This is a very practical course for all young men who are likely to be connected with the teaching of industrial subjects or their practical applications.

Biology.

There has developed within recent years a demand for better and more universal biological instruction. With the introduction of agriculture and domestic science into our schools, a knowledge of biology is demanded of a much larger number of individuals. For a long time biology was taught for its general cultural value or in its application to medicine; and to-day most of the courses in college, and universities, and some normal schools, are organized to meet the needs of the general student, or the student of medicine. Teachers of biology have failed to realize that the mass of biological instruction from now on must be largely designed for students in agriculture, domestic science, education, and medicine, and the courses must be so constructed as to meet the special needs of these students.

It is the plan and purpose of the department of biology to offer instruction in biology as it applies to these fields; and many of the courses organized are especially for the student of domestic science, agriculture, or education. There are, however, a few courses of a general nature, but they are fundamental to any education. Next semester there will be offered in this department courses in physiology, engenics, botany, bacteriology, histology, embryology and agriculture. Eugenics is the science of improvement of the race through application of the known laws of heredity. The subject is of especial interest to the girls taking domestic science, but others find it profitable and interesting. As bacteria to-day collect a higher tax from civilized nations than any other single agent, it is deemed wise that man become acquainted with these most powerful organisms, and the courses in bacteriology are to introduce the student to them and to give methods of controlling them. Physiology is fundamental to all courses in education, hygiene, and domestic science. It is taught especially with these subjects in view.

All of the courses in this department will be so taught that they will meet the needs of the student who takes them.

Correspondence Study.

In addition to their regular work, many teachers, and even those holding other positions, find that they have time to spare which could be profitably used in carrying some line or lines of work by correspondence. The work offered by the State Manual Training Normal School will afford an opportunity at least for those persons who wish to carry some correspondence work looking toward a preparation for college work; the shortening of time of residence college course, increasing their efficiency while holding positions; and those seeking to specialize in particular lines of educational work.

This brief announcement is sent out pending the printing of a complete bulletin on correspondence study. While it is impossible to do laboratory or shop work satisfactorily by correspondence, in order to accommodate those persons living near Pittsburg who may desire courses in laboratory or shop, provision has been made for some of the laboratories and shops to be open Saturday forenoons, and certain courses announced are given at that time by regular members of the faculty. Such work will be counted as residence work, provided at least four hours' laboratory work is put in every Saturday. All work done by correspondence will be under the direct supervision of the heads of the respective departments, thus assuring the very highest standard of work. Complete outlines, directions, and suggestions will be furnished each person as soon as his application for work has been received and accepted, and the regular enrollment fee has been paid. Careful and prompt attention will be given to the checking and reporting to the individual on all work sent in.

REQUIREMENTS.

All students applying for enrollment in correspondence study are requested to present the same entrance qualifications as required for admission to residence study as outlined on page 8 in the catalogue.

FEES.

The fees charged for correspondence instruction are the same as for regular students in residence, viz. $2. All fees must be paid in advance and will not be refunded on account of failure to complete the course.

TIME FOR ENROLLING.

Students will be enrolled for correspondence study at any time. Their enrollment will lapse on September first, whether they have completed the work or not. No credit will be given for courses not completed by this date, except upon special action by the committee on extension work.

EXAMINATIONS.

Examinations are required of all students seeking credit. These examinations must be taken at the Normal School or at a time, place, and under conditions approved by the institution.

NUMBER OF SUBJECTS.

No student will be permitted to take more than two five-hour subjects at any one time. We suggest that persons actively engaged in teaching should not attempt to carry more than five semester hours work at one time.

AMOUNT OF WORK CREDITED.

Not more than one-third of the work required for graduation may be taken by correspondence.

COURSES OFFERED—BY DEPARTMENTS.

ENGLISH.

Course 11. Constructive English. Five hours credit.

This work in English is correlated with the study of American Classics and is the first year normal college work. Is required in every course offered for the life certificate.

AGRICULTURE.

Course 24. Gen. Agriculture, Soil and Fertilizer. Five hours credit.
Course 26. Poultry Raising. Two hours credit.
Course 25. Animal Husbandry. Five hours credit.

EDUCATION.

Course 11. History of Education. Three hours credit.
Course 16. General Methods. Two hours credit.
Course 20. General Psychology. Three hours credit.

DRAWING AND DESIGN.

Course 20. Free-hand Drawing. Two hours credit.
Course 21. Elementary Mechanical. Two hours credit.
Course 23. Advanced Mechanical. Two hours credit.

GEOGRAPHY.

Course 11. Physiography. Five hours credit.
Course 13. Geography of American History. Five hours credit.
Course 1. Physical Geography. Two hours credit.

HIGH SCHOOL.

HISTORY AND SOCIAL SCIENCES.

Course 1. Ancient History. One-half unit credit.
Course 2. Ancient History. One-half unit credit.
Course 3. Mediæval History. One-half unit credit.
Course 4. Modern History. One-half unit credit.
Course 5. American History. One-half unit credit.
Course 6. Kansas History. One-fourth unit credit.
Course 7. Civics. One-fourth unit credit.
Course 8. Elementary Economics. One-half unit credit.

NORMAL COLLEGE.

HISTORY AND SOCIAL SCIENCES.

Course 11. General History. Five hours credit.
Course 12. English History. Five hours credit.
Course 13. Philosophy of American History. Three hours credit.
Course 14. American Government. Two hours credit.
Course 15. Industrial History. Five hours credit.

Course 16. Economics. Five hours credit.
Course 17. Constitutional History. Three hours credit.
Course 18. Political Science. Two hours credit.
Course 19. The Making of the Nation. Three hours credit.
Course 20. The Development of the Nation. Three hours credit.
Course 21. Modern Europe. Three hours credit.
Course 22. Teaching History. Two hours credit.
Course 23. Church History. Two hours credit.
Course 24. History of Reformation. Two hours credit.
Course 25. Sociology. Three hours credit.
Course 26. Applied Sociology. Two hours credit.

BIOLOGY.

Course 12. General Bacteriology. Three hours credit.
Course 11*a*. Zoölogy. Five hours credit.
Course 11*b*. Botany. Five hours credit.

All subjects in biology require laboratory work, which may be done at the State Manual Training Normal School on Saturdays.

NORMAL HIGH SCHOOL.

MATHEMATICS.

Course 1. Algebra 1. One-half unit credit.
Course 2. Algebra 2. One-half unit credit.
Course 5. Arithmetic. One-half unit credit.
Course 6. Algebra 3. One-half unit credit.
Course 9. Shop Mathematics. One-half unit credit.

NORMAL COLLEGE.

MATHEMATICS.

Course 11. College Algebra. Five hours credit.
Course 12. Trigonometry. Five hours credit.
Course 14. Analytical Geometry. Five hours credit.

All unit and hour credit is per term of twenty weeks. Any course carried both terms would give double the credits above stated.

Saturday courses count as residence work. The following courses are given for those desiring to do work in the institution Saturdays. Detail arrangements for those wishing this work will be made by the heads of the respective departments.

Biology.

Normal College.

Course 11. General Biology (Botany). Five hoours credit.
Course 12. General Bacteriology. Three hours credit.
Course 13. Household Bacteriology. Two hours credit.

Geography.

Normal College.

Course 4. Physiography. Five hours credit.

Physical Sciences.

Normal High School.

Course 1. High School Physics.

Normal College.

Course 11. General Chemistry. Five hours credit.
Course 12. Qualitative Analysis. Five hours credit.
Course 13. Quantitative Analysis. Five hours credit.
Course 14. Organic Chemistry. Five hours credit.
Course 24. Practical Electricity and Magnetism. Five hours credit.

(See head of department for additional courses.)

Manual Training.

Course 11. Bench Wood Work. One and one-half hours credit.
Course 12. Wood Carving. One and one-half hours credit.
Course 13. Wood Turning. Two and one-half hours credit.
Course 16. Forge Work. Two and one-half hours credit.
Course 19*a*. Machine Shop Practice. Two and one-half hours credit.

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